IN THE CLAIMS

Please replace the claims as filed with the claims set forth below. This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) An optical device comprising:

a multimode optical fiber; and

means for averaging a modal noise induced signal level variation of light propagating within the multimode optical fiber.

2. (Original) The optical device of claim 1 wherein the means for averaging comprises one of:

means for cyclically varying an index of refraction of the multimode optical fiber over a select period of time; and

means for scrambling a light distribution within the multimode optical fiber.

3. (Original) The optical device of claim 1 wherein the means for averaging comprises one of:

means for cyclically varying the temperature of the multimode optical fiber; and

means for cyclically manipulating the multimode optical fiber.

4. (Original) The optical device of claim 3 wherein the means for cyclically manipulating the multimode optical fiber comprises an apparatus configured to perform at least one of:

twisting the multimode optical fiber;

stretching the multimode optical fiber;

shaking the multimode optical fiber.

5. (Original) The optical device of claim 3 wherein the means for cyclically varying the temperature of the multimode optical fiber comprises a thermal element in thermal communication with the multimode optical fiber, the thermal element comprising at least one of a heater, a cooler, a source of fluid heated above ambient temperature and a source of fluid cooled below ambient temperature.

6. (Original) The optical device of claim 3 further comprising:

a temperature sensor in thermal contact with the multimode optical fiber; and

a controller receiving input from the temperature sensor and controlling the means for cyclically varying the temperature of the multimode optical fiber.

7. (Original) A method of time averaging modal noise induced signal strength variations in multimode optical fiber having an input and an output, the method comprising:

coupling light to the input of the multimode optical fiber;

cyclically varying an index of refraction of the multimode optical fiber; and

receiving the light at the output of the multimode optical fiber.

8. (Original) The method of claim 7 wherein the index of refraction of the multimode optical fiber is varied by one of:

cyclically varying the temperature of the multimode optical fiber; and

cyclically manipulating the multimode optical fiber.

9. (Original) The method of claim 8 wherein the step of cyclically varying the temperature of the multimode optical fiber comprises providing a thermal component in thermal communication with the multimode optical fiber.

10. (Original) The method of claim 9 further comprising:

providing a temperature sensor in thermal communication with the multimode optical fiber; and

controlling the thermal component with a controller receiving input from the temperature sensor.

11. (Original) The method of claim 8 wherein the step of cyclically manipulating the multimode optical fiber comprises at least one of:

twisting the multimode optical fiber;

stretching the multimode optical fiber;

shaking the multimode optical fiber.

12. (Currently Amended) An optical device for averaging a modal noise induced signal level variation of light comprising:

a multimode optical fiber;

a thermal element in thermal contact with the multimode optical fiber providing for the cyclical variation of a temperature of the multimode optical fiber.

13. (Original) The optical device of claim 12 further comprising:

a temperature sensor in thermal contact with the multimode optical fiber; and

a controller receiving input from the temperature sensor and controlling the thermal element.

14. (Original) The optical device of claim 12 further comprising:

a heat sink in thermal contact with the thermal element; and

a fan in fluid communication with the heat sink.

15. (Original) The optical device of claim 12 further comprising a spool supporting a select length of the multimode optical fiber substantially in thermal contact with the thermal element.

16. (Original) The optical device of claim 12 wherein the select length of the multimode optical fiber is between 55m and 100m.

17. (Original) The optical device of claim 12 wherein the thermal element comprises at least one of a thermoelectric module, a resistive heater, an infrared heater, a chemical heater, a refrigeration device, a chemical cooler, a source of fluid cooled below ambient temperature and a source of fluid heated above ambient temperature.

18. (Currently Amended) An optical device for averaging a modal noise induced signal level variation of light comprising:

a multimode optical fiber;

a manipulation apparatus operatively associated with the multimode optical fiber providing for the cyclical manipulation of the optical fiber.

19. (Original) The optical device of claim 18 wherein the manipulation apparatus performs a mechanical manipulation of the multimode optical fiber comprising at least one of stretching a select length of the multimode optical fiber, twisting a select portion of the multimode optical fiber, and shaking a select length of the multimode optical fiber.

20. (Original) The optical device of claim 18 wherein the manipulation apparatus comprises a piezo stretcher.

21. (Original) The optical device of claim 20 wherein the piezo stretcher is configured to stretch the multimode optical fiber through a sequence of oscillations which are selected to produce an optical mode shift of 180 degrees at minimum and maximum stretching distances.

22. (Original) The optical device of claim 18 wherein the manipulation apparatus comprises a motor.

23. (Original) The optical device of claim 22 wherein the motor is configured to cyclically twist a first portion of the multimode optical fiber in alternate clockwise and counterclockwise directions with respect to a lengthwise axis of the multimode optical fiber and relative to a second fixed portion of the multimode optical fiber.

24. (Original) A combustion sensing apparatus comprising a catch-side optical system comprising:

a multimode optical fiber;

means for averaging a modal noise induced signal level variation of light propagating within the multimode optical fiber.

25. (Original) The combustion sensing apparatus of claim 24 wherein the means for averaging comprises one of:

means for cyclically varying an index of refraction of the multimode optical fiber over a select period of time; and

means for scrambling a light distribution within the multimode optical fiber.

26. (Original) The combustion sensing apparatus of claim 24 wherein the means for averaging comprises one of:

means for cyclically varying the temperature of the multimode optical fiber; and

means for cyclically manipulating the multimode optical fiber.

27. (Original) The combustion sensing apparatus of claim 26 wherein the means for cyclically manipulating the multimode optical fiber comprises an apparatus configured to perform at least one of:

twisting the multimode optical fiber;

stretching the multimode optical fiber;

shaking the multimode optical fiber.

28. (Original) The combustion sensing apparatus of claim 26 wherein the means for cyclically varying the temperature of the multimode optical fiber comprises a thermal element in thermal communication with the multimode optical fiber comprising at least one of a heater, a cooler, a source of fluid heated above ambient temperature and a source of fluid cooled below ambient temperature.